CLAIMS

WHAT IS CLAIMED IS:

1. An isolated nucleic acid comprising at least 10 contiguous nucleotides of a polynucleotide sequence selected from the group consisting of: (a) nucleotides spanning positions 329 and 330 of the nucleotide sequences of clones 379-R8 and 379-RS3 shown in Figures 3A-3E, or its complement, and (b) consecutive nucleotides spanning positions 188 and 189 of the nucleotide sequences of clones 379-R4, 379-R5, 379-R2, 379-RS7 and 379-RS4 shown in Figures 3A-3E, or its complement.

2. A host cell comprising a recombinant nucleic acid of claim 1.

3. An expression vector comprising the isolated nucleic acid according to claim 1.

4. A host cell comprising the expression vector of claim 3.

5. The polynucleotide according to claim 1, wherein said polynucleotide, or its complement or a fragment thereof, further comprises a detectable label.

6. The polynucleotide according to claim 1, wherein said polynucleotide, or its complement or a fragment thereof, is attached to a solid support.

7. The polynucleotide according to claim 1, wherein said polynucleotide, or its complement or a fragment thereof, is prepared at least in part by chemical synthesis.

8. The polynucleotide according to claim 1, wherein said polynucleotide, or its complement or a fragment thereof, is an antisense fragment.

9. The polynucleotide according to claim 1, wherein said polynucleotide, or its complement or a fragment thereof, is single stranded.

10. The polynucleotide according to claim 1, wherein said polynucleotide, or its complement or a fragment thereof, is double stranded.

11. The polynucleotide according to claim 1, comprising at least 15 contiguous nucleotides.

12. The polynucleotide according to claim 1, comprising at least 20 contiguous nucleotides.

13. An isolated polypeptide, encoded within an open reading frame of a DKKL1 sequence selected from the group consisting of: (a) nucleotides spanning positions 329 and 330 of the nucleotide sequences of clones 379-R8 and 379-RS3 shown in Figures 3A-3E, or its complement, and (b) consecutive nucleotides spanning positions 188 and 189 of the nucleotide sequences of clones 379-R4, 379-R5, 379-R2, 379-RS7 and 379-RS4 shown in Figures 3A-3E, or its complement.

14. An isolated polypeptide, encoded within an open reading frame of a DKKL1 sequence selected from the group consisting of: (a) at least 4 consecutive residues spanning positions 108 and 109 of the polypeptide sequences of clones 379-R8 and 379-RS3 shown in Figures 4A-4B, and (b) at least 4 consecutive residues spanning positions 61 and 62 of the polypeptide sequences of clones 379-R4, 379-R5, 379-R2, 379-RS7 and 379-RS4 shown in Figures 4A-4B.

15. The polypeptide of claim 14, wherein said polypeptide comprises the amino acid sequence of an epitope of the amino acid sequence of a DKKL1 polypeptide selected from the group consisting of: (a) at least 4 consecutive residues spanning positions 108 and 109 of the polypeptide sequences of clones 379-R8 and 379-RS3 shown in Figures 4A-4B, and (b) at least 4 consecutive residues spanning positions 61 and 62 of the polypeptide sequences of clones 379-R4, 379-R5, 379-R2, 379-RS7 and 379-RS4 shown in Figures 4A-4B.

16. The polypeptide of claim 14, wherein said polypeptide or fragment thereof is attached to a solid support.

17. An isolated antibody or antigen binding fragment thereof, that binds to a polypeptide according to any one of claims 13-16.

18. The isolated antibody or antigen binding fragment thereof according the claim 17, wherein said antibody or fragment thereof is attached to a solid support.

19. The isolated antibody or antigen binding fragment thereof according the claim 17, wherein said antibody is a monoclonal antibody.

20. The isolated antibody or antigen binding fragment thereof according the claim 17, wherein said antibody is a polyclonal antibody.

21. The isolated antibody or antigen binding fragment thereof according the claim 17, wherein said antibody or fragment thereof further comprises a detectable label.

22. An isolated antibody that binds to a polypeptide, or antigen binding fragment thereof, according to any of claims 13-16, prepared by a method comprising the steps of: (i) immunizing a host animal with a composition comprising said polypeptide, or antigen binding fragment thereof, and (ii) collecting cells from said host expressing antibodies against the antigen or antigen binding fragment thereof.

23. The monoclonal antibody according to claim 19, wherein the monoclonal antibody is prepared by a process comprising:

(a) providing a hybridoma capable of producing the monoclonal antibody; and

(b) culturing the hybridoma under conditions that provide for the production of the monoclonal antibody by the hybridoma.

24. A hybridoma that produces the monoclonal antibody according to claim 19.

25. The antibody according to claim 17, wherein the antibody is a humanized antibody.

26. A kit for detecting cancer cells comprising the antibody according to claim 17.

27. A kit for detecting cancer cells comprising the monoclonal antibody according to claim 19.

28. A kit for diagnosing the presence of cancer in a test sample, said kit comprising at least one polynucleotide that selectively hybridizes to a DKKL1 polynucleotide sequence selected from the group consisting of: (a) nucleotides spanning positions 329 and 330 of the nucleotide sequences of clones 379-R8 and 379-RS3 shown in Figures 3A-3E, or its complement, and (b) consecutive nucleotides spanning positions 188 and 189 of the nucleotide sequences of clones 379-R4, 379-R5, 379-R2, 379-RS7 and 379-RS4 shown in Figures 3A-3E, or its complement.

29. A method of screening for anticancer activity comprising:

(a) providing a cell that expresses a DKKL1 gene encoded by a nucleic acid sequence selected from the group consisting of: (a) nucleotides spanning positions 329

and 330 of the nucleotide sequences of clones 379-R8 and 379-RS3 shown in Figures 3A-3E, or its complement, and (b) consecutive nucleotides spanning positions 188 and 189 of the nucleotide sequences of clones 379-R4, 379-R5, 379-R2, 379-RS7 and 379-RS4 shown in Figures 3A-3E, or its complement;

(b) contacting a tissue sample derived from a cancer cell with an anticancer drug candidate; and

(c) monitoring an effect of the anticancer drug candidate on an expression of the DKKL1 polynucleotide in the tissue sample.

30. The method of screening for anticancer activity according to claim 29, further comprising:

(d) comparing the level of expression in the absence of said drug candidate to the level of expression in the presence of the drug candidate.

31. A method for detecting cancer associated with expression of a polypeptide in a test cell sample, comprising the steps of:

(i) detecting a level of expression of at least one DKKL1 polypeptide selected from the group consisting of: (a) at least 4 consecutive residues spanning positions 108 and 109 of the polypeptide sequences of clones 379-R8 and 379-RS3 shown in Figures 4A-4B, and (b) at least 4 consecutive residues spanning positions 61 and 62 of the polypeptide sequences of clones 379-R4, 379-R5, 379-R2, 379-RS7 and 379-RS4 shown in Figures 4A-4B; and

(ii) comparing the level of expression of the polypeptide in the test sample with a level of expression of polypeptide in a normal cell sample, wherein an altered level of expression of the polypeptide in the test cell sample relative to the level of polypeptide expression in the normal cell sample is indicative of the presence of cancer in the test cell sample.

32. A method for detecting cancer associated with the presence of an antibody in a test serum sample, comprising the steps of:

(i) detecting a level of an antibody against an antigenic polypeptide selected from the group consisting of detecting a level of expression of at least one DKKL1 polypeptide

selected from the group consisting of: (a) at least 4 consecutive residues spanning positions 108 and 109 of the polypeptide sequences of clones 379-R8 and 379-RS3 shown in Figures 4A-4B, and (b) at least 4 consecutive residues spanning positions 61 and 62 of the polypeptide sequences of clones 379-R4, 379-R5, 379-R2, 379-RS7 and 379-RS4 shown in Figures 4A-4B; and

(ii) comparing said level of said antibody in the test sample with a level of said antibody in the control sample, wherein an altered level of antibody in said test sample relative to the level of antibody in the control sample is indicative of the presence of cancer in the test serum sample.

33. A method for screening for a bioactive agent capable of modulating the activity of a DKKL1 protein, wherein said protein is encoded by a nucleic acid comprising a nucleic acid sequence selected from the group consisting of (a) nucleotides spanning positions 329 and 330 of the nucleotide sequences of clones 379-R8 and 379-RS3 shown in Figures 3A-3E, or its complement, and (b) consecutive nucleotides spanning positions 188 and 189 of the nucleotide sequences of clones 379-R4, 379-R5, 379-R2, 379-RS7 and 379-RS4 shown in Figures 3A-3E, or its complement, the method comprising:

a) combining the DKKL1 protein and a candidate bioactive agent; and

b) determining the effect of the candidate agent on the bioactivity of the protein.

34. The method of screening for the bioactive agent according to claim 33, wherein the bioactive agent affects the expression of the DKKL1 protein.

35. A method for treating cancers comprising administering to a patient an inhibitor of a DKKL1 protein, wherein said protein is encoded by a nucleic acid comprising a nucleic acid sequence selected from the group consisting of: (a) nucleotides spanning positions 329 and 330 of the nucleotide sequences of clones 379-R8 and 379-RS3 shown in Figures 3A-3E, or its complement, and (b) consecutive nucleotides spanning positions 188 and 189 of the nucleotide sequences of clones 379-R4, 379-R5, 379-R2, 379-RS7 and 379-RS4 shown in Figures 3A-3E, or its complement.

36. The method for treating cancers according to claim 35, wherein the inhibitor of a DKKL1 protein binds to the DKKL1 protein.

37. A method for inhibiting expression of a DKKL1 gene in a cell comprising:

contacting a cell expressing a DKKL1 gene with a double stranded RNA comprising a sequence capable of hybridizing to a DKKL1 mRNA corresponding to the polynucleotide sequences of (a) nucleotides spanning positions 329 and 330 of the nucleotide sequences of clones 379-R8 and 379-RS3 shown in Figures 3A-3E, or its complement, and (b) consecutive nucleotides spanning positions 188 and 189 of the nucleotide sequences of clones 379-R4, 379-R5, 379-R2, 379-RS7 and 379-RS4 shown in Figures 3A-3E, or its complement, in an amount sufficient to elicit RNA interference; and

inhibiting expression of the DKKL1 gene in the cell.

38. The method of claim 37, wherein the double stranded RNA is provided by introducing a short interfering RNA (siRNA) into the cell by a method selected from the group consisting of transfection, electroporation, and microinjection.

39. The method of claim 37, wherein the double stranded RNA is provided by introducing a short interfering RNA (siRNA) into the cell by an expression vector.